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TECHNICAL ABSTRACTS

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✓ LEAD DEVELOPMENT ASSOCIATION

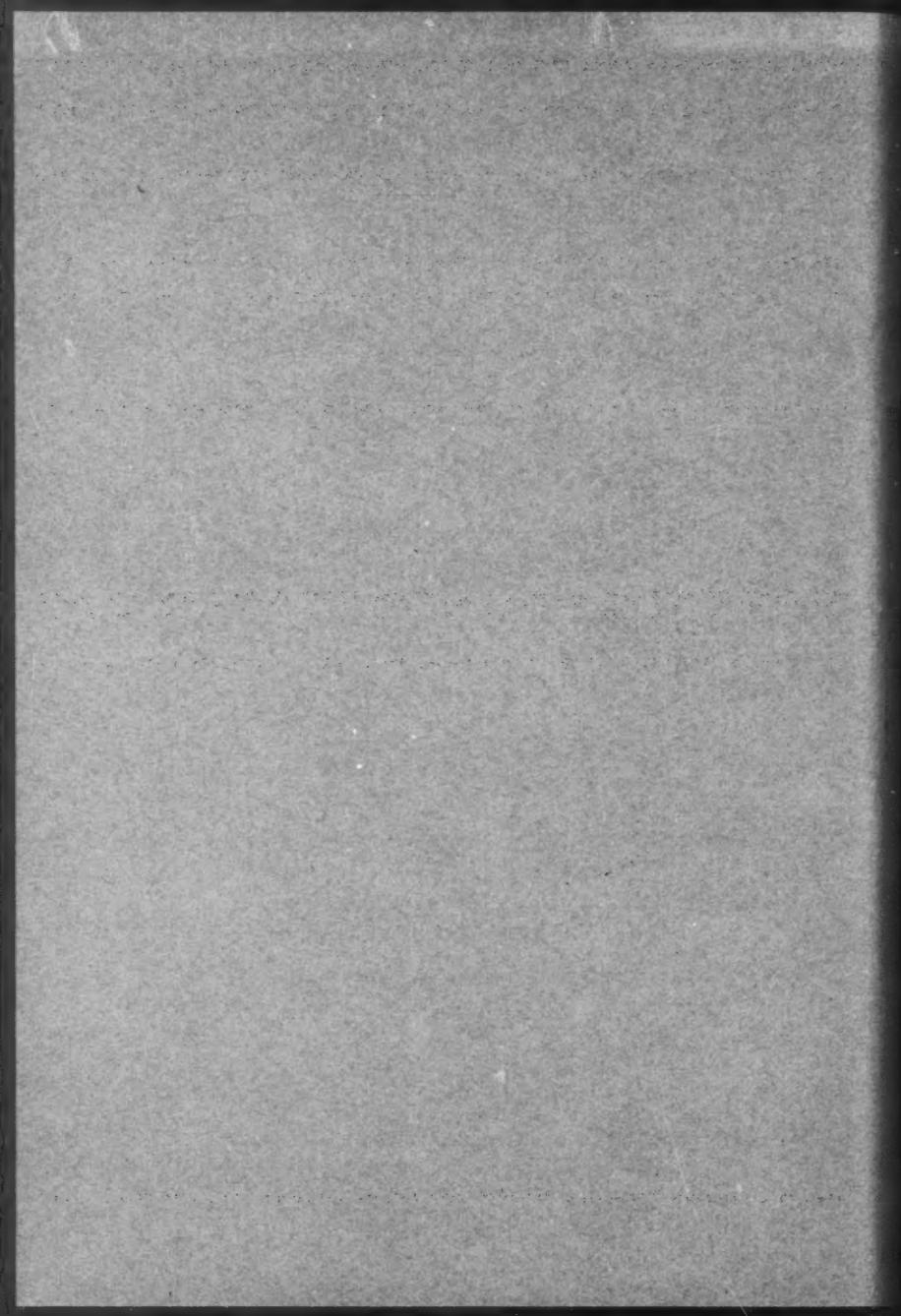
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INTRODUCTION

We take this opportunity, in forwarding the second issue of Technical Abstracts, to list the other publications of the Lead Development Association.

LEAD NEWS. A periodical publication describing new uses and developments of existing uses of lead.

APPLICATIONS OF LEAD. Non-technical brochures on "Lead in Cable Manufacture", "Lead Paints To-day", "Lead for Batteries", "Lead in Atomic Energy", "Lead Sheet and Pipe" and "Lead in Solders & Fusible Alloys".

SIMPLE NOTES ON LEAD AND ITS USES and WALL CHART
These publications are suitable for the instruction of children aged 12-16.

PUBLISHED INFORMATION ON LEAD. A list of technical books on lead for advanced students and technicians.

THE PAINTING OF STEEL. Notes from a paper by J. C. Hudson, D.Sc., F.I.M., to the Institute of Metal Finishing.

Lead Sheet and Pipe Section

PLUMBER'S HANDBOOK. A comprehensive handbook for plumbers and plumbing students.

LEADWORK FOR PLUMBERS. A periodical review on the use of lead sheet and pipe written particularly for plumbers.

INFORMATION SHEETS. Technical information sheets for architects, surveyors and builders.

TECHNICAL BULLETINS

Lead and Lead Alloy Water Service Pipe Below Ground.
Practical Notes on Leadburning for Plumbers.
Lead Pipe for Gas Distribution in Buildings.
Concise Information on Lead Pipe and Lead Sheet.

C O N T E N T S

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PART I
TECHNICAL PAPERS

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BATTERIES

68 SILVER, COBALT, AND POSITIVE-GRID CORROSION IN THE LEAD-ACID BATTERY

J. J. Lander

J. Electrochem. Soc., June, 1958, 105(6), 289-292.

Use of silver in grid alloys to reduce grid corrosion and addition of cobalt to the electrolyte for the same purpose.

69 SELF-DISCHARGE REACTIONS IN LEAD-ACID BATTERIES

P. Ruetschi et al

J. Electrochem. Soc., Oct., 1958, 105(10), 555.

A theoretical and experimental analysis of self-discharge and the rates of the contributing reactions.

70 LEAD-ACID STORAGE BATTERIES. CHANGES IN POSITIVE ACTIVE MATERIAL DENSITY DURING VARIOUS CONDITIONS OF SERVICE

J. F. Dittmann et al

J. Electrochem. Soc., Oct., 1958, 105(10), 553.

Positive active material undergoes density decrease regardless of shedding.

BEARINGS

71 SWEEP FREQUENCY EDDY-CURRENT DEVICE TO MEASURE OVERLAY THICKNESS

E. A. Hanusz

Rev. Sci. Instruments, May, 1958, 29(5), 411-415.

Suggested applications of this device include Pb-Sn and Pb-In plated overlays in bearings.

CHEMISTRY

72 REACTION EQUILIBRIA BETWEEN MOLTEN LEAD AND METAL OXIDES. II.

E. Pelzel

Erzmetall, June, 1958, 11(6), 247-252.

This paper deals with the systems:—



73 DETERMINATION OF PLUTONIUM AS A MINOR CONSTITUENT IN ALLOYS WITH LEAD, TIN AND BISMUTH

K. W. Brooke,
D. H. F. Atkins
and E. N. Jenkins

AERE C/M 336, 1958, 4 pp., H.M.S.O. 1s. 9d.

Determination of plutonium by counting alpha emission from samples prepared by evaporation of solutions of the metals concerned.

74 THERMODYNAMIC STUDY OF LIQUID Pb-Zn SOLUTIONS

F. D. Rosenthal,
G. J. Mills
and F. J. Dunkerley

Trans. A.I.M.E., April, 1958, 212(2), 153-161.

Determination of various constants by electrode potential method at 400-650°C: activity measurements extended to 900°C by vapour pressure method.

75 PHOTOMETRIC DETERMINATION OF TIN IN ZINC AND LEAD

E. Eberius

Metall, Aug., 1958, 12(8), 721-724.

A new method for 0.0001%-0.1% tin involving extraction with cupferron and determined by its coloured complex with pyrrolidinedithiocarbamate (PDTC).

CORROSION

- 76 ELECTROCHEMICAL PROPERTIES OF PbO₂ AND THE ANODIC CORROSION OF LEAD AND LEAD ALLOYS**

P. Ruetschi
and B. D. Cahan

J. Electrochem. Soc., July, 1958, 105(7), 369-377.

- 77 THE CORROSION OF LEAD BY DILUTE AQUEOUS ORGANIC ACIDS**

E. L. Coles,
J. G. Gibson
and R. M. Hindle

J. Applies Chem., May, 1958, 8(5), 341-348.

Corrosion under conditions of total immersion, of 0.16% Sb/Pb alloy. Corrosion rates given for various organic acids. Type of attack and corrosion products, if any, discussed.

- 78 MECHANISM OF LEAD CORROSION IN WATER AND WATER-DIOXAN MIXTURES**

M. Karsulin
and T. Markovic

CITCE Seventh Meeting, Page 282, 1955.

CREEP AND FATIGUE

- 79 STRUCTURE AND CREEP OF LEAD ALLOYS**

W. Hofmann
and H. Von Malotki

Metall, Aug., 1958, 12(8), 695-697.

A survey of work published in the last 20 years: includes lead, various hard leads and Pb-Ca alloy. Eighteen references.

- 80 THE COMPRESSION RESISTANCE OF LEAD AND LEAD ALLOYS**

E. Pelzel

Z. Metallkunde, May, 1958, 49(5), 236-239.

Tests at up to 200°C on lead and various binary lead alloys.

ENAMELS

81 ENAMELLED ALUMINIUM

H. Kyri

Aluminium, April, 1958, 34(4), 213-216.

A complete survey both of production techniques and applications. Also considers future prospects.

82 FIRING VITREOUS ENAMELS ON ALUMINIUM IN A CONVEYORISED OVEN

L. T. Ines

Ind. Heating, April, 1958, 25(4), 771-778 (even pages).

Description of an electrically heated, convection oven, with brief account of the enamelling process.

LEAD — GENERAL

83 PROPOSED TENTATIVE SPECIFICATION FOR REFINED SECONDARY LEAD. ASTM DESIGNATION: B-58T

American Society for
Testing Materials

ASTM Preprint No. 8, 1958, pp. 4-5.

84 LEAD AND ITS ALLOYS

Ind. and Eng. Chem., Sept., 1958, 50(9), 1449.

Review of recent progress in constructional uses. Eighty-nine references.

METALLURGY

85 REDETERMINATION OF LIQUIDS OF SYSTEM LEAD-MAGNESIUM IN RANGE 0-3 WEIGHT PER CENT MAGNESIUM

G. W. Horsley
and J. T. Maskrey

J. Inst. Metals, June, 1958, 86(10), 446-448.

Eutectic placed at 2.25-2.30% Mg. at $248.5^{\circ}\text{C} \pm 0.25^{\circ}\text{C}$.

86 ANNEALING TWINS IN ZONE-REFINED LEAD AND LEAD-SILVER ALLOYS

G. F. Bolling
and W. C. Winegard

J. Inst. Metals, July, 1958, 86(11), 492-496.

Experimental description of twinning considering free energies at grain boundaries.

REFINING

87 ELECTROLYTIC REFINING OF LEAD IN THE SAN GAVINO SMELTER, MONREALE

E. Freni

Translation from Metallurgia Italiana, Feb., 1957, 49(2), 107-125.

88 ELECTROLYTIC RECOVERY OF ANTIMONY FROM BATTERY WASTES

B. B. Dey,
V. Aravumuttan and
P. R. Rajagopalan

J. Sci. Ind. Res. (India), June, 1958, 17A(16), 240-242.

Electro-refining of lead antimony battery scrap in a fluoborate bath.

SMELTING

- 89 LEAD SMELTING AT BOLIDENS GRUVAKTIE-BOLAG**

*B. Lindvall
and S. Wallden*

Erzmetall, June, 1958, 11(6), 264-272.

This paper gives full details of the operations at this Swedish plant, including sintering, smelting, converting, refining, and fume treatments.

- 90 SINTER ROASTING OF LEAD-RICH GALENA CONCENTRATES AT THE ELECTROTHERMIC LEAD PLANT OF THE RONNSKAR WORKS, SWEDEN**

*J. Wallden,
N. B. Lindvall
and K. G. Gorling*

Trans. A.I.M.E., April, 1958, 212(2), 146-153.

Description of pelletising and sintering lead concentrates with 70-80% Pb contents.

STATISTICS

- 91 PRODUCTION, CONSUMPTION AND PRICING OF LEAD SINCE 1945**

P. Ketzer

Erzmetall, Aug., 1958, 11(8), 396-400.

General statistical work covering production and consumption both in Federal German Republic and other parts.

- 92 NON-FERROUS METALS STATISTICS, 1955-1957**

O.E.E.C.

Production, Consumption, Foreign Trade, Breakdown of Uses.



PART II

PATENTS

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BATTERIES

93 BRITISH PATENT 800,734. "ELECTRODES FOR STORAGE BATTERIES"

J. BRENNAN

The essence of this invention is that the active material is surrounded by a porous coherent layer of metal and the whole is enclosed and supported by a bag woven from filaments of a material of high tensile strength such as silica.

94 BRITISH PATENT 802,379. "HERMETICALLY CLOSED STORAGE BATTERY"

SVENSKA ACKUMULATOR A/B. JUNGER

The problem of gas discharge is solved by keeping the positive plate permanently in a higher state of charge than the negative, and conducting the oxygen evolved on to the negative where it is absorbed.

On charging the battery, the positive plate becomes fully charged before the negative. The oxygen which is then given off is passed over the negative where it is absorbed, thereby preventing the negative from becoming fully charged and so avoiding the evolution of hydrogen. On discharging, the negative plate becomes completely discharged before the positive, and the production of hydrogen is again prevented. Mention is made of devices for ensuring that the plates are out-of-balance and controlling the movements of the gaseous oxygen.

95 BRITISH PATENT 802,641. "LEAD ACID ELECTRIC ACCUMULATOR"

W. S. O'SHEA

The lead connections from the outside terminals to the interior of the battery are sealed into plastic sleeves. These connections have a series of annular grooves, around which the plastic is moulded, to increase the total distance along which the acid must travel before leakage can occur.

96 BRITISH PATENT 803,400. "ELECTRIC ACCUMULATOR"

CHLORIDE BATTERIES LTD.

The positive material in this type of accumulator is contained in vertical tubes and packed round lead alloy spines. The invention consists of making the tube walls of thin plastic material, which has been made porous by means of a number of short parallel horizontal slits. When the tube is stretched an open-mesh type of material results, which resembles expanded metal. As well as having a high degree of porosity, the tube wall, while strong, is sufficiently elastic to allow for the expansion of the material during the charge-discharge cycle.

97 SOUTH AFRICAN PATENT 2828/58. "BATTERY SEPARATORS"

OLDHAM & SON LTD.

Separators for lead acid batteries made from resin and fibre glass. First the glass fibres are bonded by impregnation with an acid-resistant resin and then cured. Next, this cured base is coated with a thermo-plastic in powder form, a thickening agent and a solvent for the latter. The whole is then heated, when the solvent evaporates and the particles of the thermo-plastic fuse together.

98 INDIAN PATENT 63,905. "POSITIVE PLATES FOR LEAD-ACID ELECTRIC ACCUMULATORS"

CHLORIDE ELECTRICAL STORAGE CO. LTD.

The grid is made from an alloy containing calcium, aluminium, tin and lead and then afterwards coated with lead.

99 BRITISH PATENT 802,825. "LEAD ALLOYS FOR BATTERIES"

ACCUMULATOREN FABRIK A.G.

Battery grid alloy composition. This lead alloy has an antimony content of 2 to 20% (preferably 5 to 8%), arsenic of 0.075 to 0.1% and a copper 0.04 to 0.12%.

100 AUSTRALIAN PATENT 36,061/58. "ACCUMULATOR ELECTRODES"
TUDOR A/B.

This patent deals with the composition of the lead alloy used for the battery grids, into which a small proportion of cobalt and/or silicon is incorporated.

101 INDIAN PATENT 64,123. "LEAD ACCUMULATOR ELECTRODES"
TUDOR A/B.

Same as Australian Patent 36,061/58 above.

102 BRITISH PATENT 804,692. "ELECTRIC ACCUMULATORS"
YARDNEY INTERNATIONAL CORPN.

The active compounds in powder form are mixed with a liquid plastic, preferably polystyrene, shaped to form an electrode and the paste allowed to set. This technique overcomes the disadvantages formerly encountered when the material tended to sag, which decreased the efficiency of the battery and gave rise to the possibility of a short-circuit.

103 SOUTH AFRICAN PATENT 2,849/58. "LEAD ACID ACCUMULATOR TUBULAR PLATES"

CHLORIDE BATTERIES LTD.

Vertical tubes for containing the active pastes are made from a woven or knitted yarn, resistant to acid, and lined internally with a thin glass fibre cylinder. These two concentric tubes are coated with acid-resistant resin and cured together in such a way that the resin consolidates the whole without blocking the interstices.

104 INDIAN PATENT 63,278. "ELECTRODE FOR STORAGE BATTERIES"
TUDOR A/B.

This invention comprises a battery which is fitted with a bottom bar made of insulating material, resistant to the electrolyte. The bar is firmly attached to the battery cover by a suitable means.

105 GERMAN PATENT 1,043,434. "DRY CHARGED PLATES FOR LEAD ACCUMULATORS"

W. R. GRACE & CO.

Charged plates for lead acid batteries may be dried by means of a stream of hot air, the velocity of which must be greater than 1,000 centimetres per second. There is a relationship given between the velocity and temperature and if this condition is observed the negative plates do not become oxidised in the drying process.

CABLES

106 AUSTRALIAN PATENT 34557/58. "LEAD SHEATHED ELECTRIC CABLES"

FIBREGLASS LTD., AND W. T. GLOVER & CO. LTD.

A glass fibre resin laminate jacket is fitted round the lead sheath of the cable in order to provide a reinforcement. The strands of glass fibre run helically round the sheath and the elasticity is such as to prevent the lead expanding excessively under the internal pressure in the cable. The resin is sufficiently strong to prevent the helical strands separating and thereby allowing distortion of the lead. Although the resin is of the thermo-setting type, the whole unit is sufficiently flexible to permit the cable to conform to the normal bending requirements.

107 AUSTRALIAN PATENT 35,646/58. "ALUMINIUM SHEATHED CABLES"
STANDARD TELEPHONES & CABLES PTY. LTD.

An electric cable has an aluminium sheath on to which there is applied a thin layer of lead.

108 BELGIAN PATENT 566,311. "EXTRUSION OF LEAD FOR CABLE SHEATHS"

PIRELLI S.p.A.

A metal tube, through which the cable passes, is connected at one end to the die of the cable press, and at the other to the drying chamber (or impregnating chamber, if required). It applies especially to pressure impregnation.

The tube is constructed to allow for thermal movement, and to permit die changing when necessary.

CHEMICALS

109 GERMAN PATENT 1,044,047. "LEAD AZIDE"
BOSTROM A.G.

Lead azide is precipitated from a hot aqueous solution containing dextrin.

COATINGS

- 110 BRITISH PATENT 803,316. "METALLIC DIP-COATING OF METAL OBJECTS"**

HORIZONS INC.

The coating of a refractory metal by a metallic lubricant in order to facilitate heavy cold working of the former. Titanium, or zirconium, for example, or alloys rich in these metals, may be coated by a soft metal, such as lead, in order to enable the refractory material to undergo working operations, for example drawing, without seizing or galling. The metal is first dipped into a suitable flux and then immersed in the molten soft metal.

- 111 BRITISH PATENT 802,832. "VITREOUS ENAMEL COATING OF ALUMINIUM AND ALUMINIUM ALLOYS"**

ROBERTSON THAIN LTD.

Lead based enamels are frequently used to enamel aluminium and its alloys. This patent covers the application of a second metal to the surface of the aluminium, applying the enamelling frit and then firing the whole to fuse the frit and cause the second metal to diffuse into both the enamel and the aluminium. The bonding metal can be chosen from a list, which is given.

- 112 GERMAN PATENT 1,043,594. "LEAD COATING OF METALS"**

KNAPP MILLS INC.

This is similar to British Patent 718,351 and describes the Knapp Mills method of cladding metal, such as steel, by a thick adherent coating of lead.

ELECTRO-PHYSICS

- 113 BRITISH PATENT 801,849. "CERAMIC DIELECTRICS"**

GENERAL ELECTRIC CO. LTD.

Materials capable of being permanently polarised to form piezoelectric components for use in, say, electro-mechanical transducers. These substances consist of sodium or potassium oxide, cadmium or lead oxide and niobium or tantalum oxide. The oxides are mixed in definite proportions, pressed and pre-fired to 1,000-1,100°C. This mixture is then powdered, pressed to the desired shape and sintered at 1,100-1,350°F.

EQUIPMENT

- 114 BRITISH PATENT 801,819. "CONTINUOUS CASTING DEVICE"**

B. FRANKLIN

From the bottom of a bath containing molten metal, a tube is led to a horizontal moulding channel which can be externally cooled. The tube is plugged at the top end and a bar is placed in the moulding channel to cause an obstruction. The plug is then removed and the channel filled with molten metal. The bar is slowly withdrawn and the hydrostatic head of the liquid forces the material out from the moulding channel where it has become solidified.

Alternatively, pinch rolls may be provided to withdraw the solidified material. Hollow sections may be obtained by fitting a mandrel in the entry end of the moulding channel.

115 BRITISH PATENT 803,809. "ROLLING MILL DRIVING DEVICE"**JIDET**

This covers a driving device to allow movement of the displaceable roller. The two main rollers are each connected to separate identical gear boxes by horizontal splined shafts. The two gear boxes in their turn are connected to each other by another (vertical) splined shaft.

PIGMENTS**116 SOUTH AFRICAN PATENT 3,814/57. "LEAD PHOSPHATE—SILICATE PIGMENTS"****NATIONAL LEAD CO.**

The composition of this material is given, each constituent having a small range of values.

REFINING**117 SOUTH AFRICAN PATENT 1886/58. "LEAD REFINING"****BRITISH OXYGEN CO. LTD.**

Antimony can be removed from lead by allowing the molten alloy to fall through an oxidising atmosphere.

SMELTING**118 GERMAN PATENT 1,041,256. "SMELTING OF ZINC- AND LEAD-CONTAINING MATERIAL"****NATIONAL SMELTING CO. LTD.**

This is similar to British Patent 741,249 and covers the smelting of lead and zinc together, in the same blast furnace.

119 AUSTRALIAN PATENT 36,056/58. "PRODUCTION OF LEAD"**METALLGES A.G.**

In this invention metallic lead is produced from lead sulphide in a single step. The sulphide is melted and then an oxygen-enriched air-stream is directed against an area of the surface to produce a region of incandescence.

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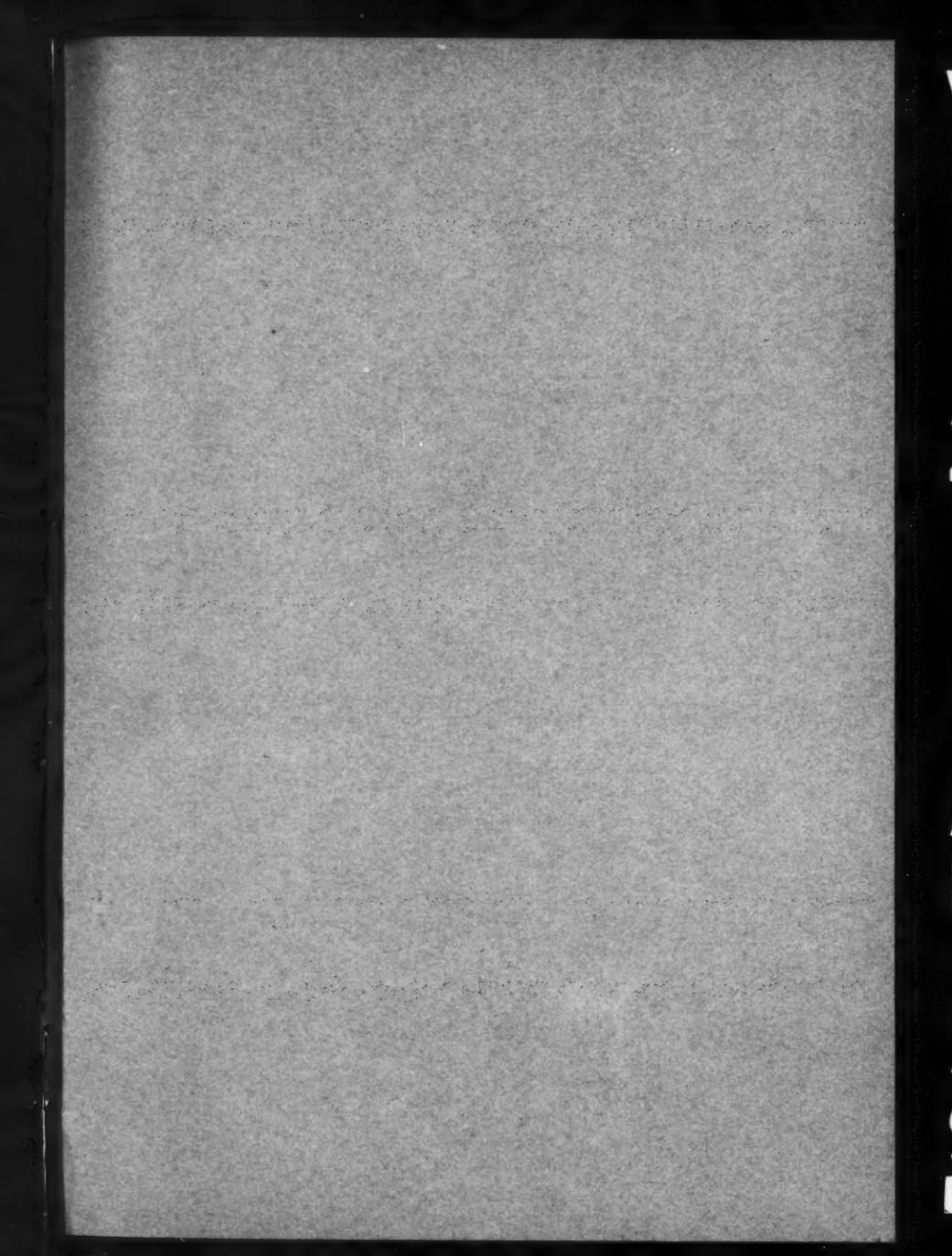
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